(5) Provide fore and aft access between detached trunks and superstructures by permanent gangways;

(6) Be at least 60 percent of the breadth of the ship in way of the trunk; and

(7) Be at least 0.6 *L* in length, if no superstructure, is provided.

§ 45.63 Correction for sheer.

(a) The minimum summer freeboard must be increased by the deficiency, or may be decreased by the excess as limited by § 45.65, of sheer calculated from table 4, multiplied by:

$0.75—(S/2L)$

where *S* is the total length of enclosed superstructures. Trunks are not included.

§ 45.65 Excess sheer limitations.

The decrease in freeboard allowed in § 45.63 is limited as follows:

SHEER CALCULATION—TABLE 4

Station	Actual ordinate	S. M.	Product	
After Half:				
AP		1		
L/6-AP		3		
L/3-AP		3		
Midship		1		
Sum of Aft Products				
After Standard Sheer .2665L+26.65[1]				
Difference: Sum-STD				+Excess/−Deficiency
AFT Sheer: Diff÷8				Excess/Deficiency
Fwd. Half:				
FP		1		
L/6-FP		3		
L/3-FP		3		
Midships		1		
Sum of Fwd Products				
Fwd Standard Sheer .5330L+53.30[1]				
Difference: Sum-STD				+Excess/−Deficiency
FWD Sheer: Diff÷8				Excess/Deficiency

[1] L in Standard Sheer=L or 500 whichever is less.

Sheer Summation

Aft Sheer±	
Fwd Sheer±	
Net Sheer±	
Mean: Net−2	Excess/Deficiency

(a) In vessels having no enclosed superstructure from 0.1 *L* abaft amidships to 0.1 *L* forward of amidships, no decrease is allowed.

(b) In vessels having enclosed superstructures amidships less than 0.1 *L* before and abaft amidships, the decrease must be reduced by linear interpolation.

(c) If excess sheer exists in the forward half, and the after half is at least 75 percent of standard sheer, the full decrease is allowed. If the after sheer is between 50 percent and 75 percent of standard sheer an intermediate decrease, determined by linear interpolation, is allowed for the excess sheer forward. If the after sheer is 50 percent of standard or less, no decrease is allowed for the excess sheer forward.

(d) Where an enclosed poop or forecastle is of standard height with greater sheer than that of the freeboard deck, or is greater than standard height, an addition to the sheer of the freeboard deck may be made using the following formula:

$S=vL'/3L$

Where

s=sheer credit, to be deducted from the deficiency or added to the excess of sheer.

v=difference between actual and standard height of superstructure at the end ordinate.

L'=mean enclosed length of poop or forecastle up to a maximum length of 0.5 *L*.

The superstructure deck must not be less than standard height above this curve at any point. This curve must be used in determining the sheer profile for forward and after halves of the vessel.

(e) The maximum decreased for excess sheer must be no more than 1½ inches per 100 feet of length.

(f) Where the deck of an enclosed superstructure has at least the same sheer as the exposed freeboard deck, the sheer of the enclosed portion of the freeboard deck cannot be taken into account.

§ 45.67 Sheer measurement.

(a) The sheer is measured from the freeboard deck at side to a line of reference drawn parallel to the keel through the sheer line at amidships;

(b) In ships designed with a rake of keel or designed to trim by the stern, the sheer must be measured in reference to a line drawn through the sheer line at amidships parallel to the design load waterline.

(c) In flush deck ships and in ships with detached superstructures, the sheer must be measured at the freeboard deck.

(d) In ships with a step or break in the topsides, the sheer must be measured from the equivalent depth amidships.

(e) In vessels with a superstructure of standard height that extends over the whole length of the freeboard deck, the sheer must be measured on the superstructure deck. Where the height of superstructure exceeds the standard, the least difference (Z) between the actual and standard heights must be added to each end ordinate. Similarly, the intermediate ordinates at distance of ⅙ *L* and ⅓ *L* from each perpendicular must be increased by 0.444 Z and 0.111 Z respectively.

§ 45.69 Correction for bow height.

(a) The minimum summer freeboard of all manned vessels must be increased by the same amount in inches as any deficiency which may be shown by the following formulas:

(1) For vessels having a length of not less than 79 feet and not greater than 550 feet,

0.593 *L* (1.0–*L*/1640) inches—actual bow height

(2) For vessels having a length greater than 550 feet,

(341.6—0.227 L) inches—actual bow height

(b) Where the bow height is obtained by sheer, the sheer must extend for at least 15 percent of the length of the vessel measured from the forward perpendicular.

(c) Where the bow height is obtained by a superstructure, the superstructure must be enclosed and extend from the stem to a point at least 0.06 *L* abaft the forward perpendicular.

(d) Vessels which, to suit exceptional operational requirements, cannot meet the requirements of paragraph (c) of this section may be given special consideration by the Commandant.

(e) The bow height is defined as the vertical distance at the forward perpendicular between the waterline corresponding to the assigned summer freeboard at the designed trim and the top of the exposed deck at side.

§ 45.71 Midsummer freeboard.

The minimum midsummer freeboard (fms) in inches is obtained by the formula:

$$fms = f(s) - 0.3\mathrm{Ts}$$

where:

f(*s*)=summer freeboard in inches

Ts=distance in feet between top of keel and the summer load line.

§ 45.73 Winter freeboard.

The minimum winter freeboard (fw) in inches is obtained by the formula:

$$fw = f(s) + T \text{ s } (200)/L$$

where:

L=length L in feet but not less than 400 feet.

§ 45.75 Intermediate freeboard.

The minimum intermediate freeboard (f_I) in inches is obtained by the formula:

$$f_I = f(s) + T \text{ s}(100)/L$$

where:

L=length L in feet but not less than 400 feet.

§ 45.77 Salt water freeboard.

(a) The salt water addition in inches to freeboard applicable to each fresh water mark is obtained by the formula:

Addition=Δ/41T